

WHAT IS CLAIMED IS:

1. An integrated process for preparing iso-olefins from syngas, the process comprising:
 - (a) subjecting syngas to low temperature Fischer-Tropsch reaction conditions in the presence of a Fischer-Tropsch catalyst to form a hydrocarbon product stream comprising substantially waxy products;
 - (b) isolating the waxy products from the hydrocarbon product stream;
 - (c) subjecting the waxy products to an olefin-selective paraffin cracking process to form C₃₋₅ olefins; and
 - (d) oligomerizing the C₃₋₅ olefins to form a hydrocarbon product comprising iso-olefins.
2. The process of claim 1, wherein the olefin-selective paraffin cracking process comprising contacting the waxy products with an intermediate pore size siliceous crystalline molecular sieve having a silica:alumina mole ratio from about 25:1 to about 500:1.
3. The process of claim 2, wherein the Fischer Tropsch catalyst comprises a catalyst which provides high chain growth probabilities.
4. The process of claim 3 wherein the catalyst comprises cobalt.
5. The process of claim 1, wherein the hydrocarbon product stream comprises less than 10% methane.
6. The process of claim 1, wherein the hydrocarbon product stream comprises less than 5% methane.
7. The process of claim 1, wherein the hydrocarbon product stream comprises less than 2% methane.

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8. The process of claim 1, further comprising the steps of: isolating a C₃₋₅ olefins fraction from the hydrocarbon product stream; blending the C₃₋₅ olefins fraction with the C₃₋₅ olefins of step (c) to form a blended C₃₋₅ olefins; and oligomerizing the blended C₃₋₅ olefins to form iso-olefins.

9. The process of claim 1, further comprising hydrogenating at least a portion of the iso-olefins of step (d) to form isoparaffins.

10. The process of claim 1, further comprising the step of distilling the hydrocarbon product of step (d) to provide distillate-boiling iso-olefins.

11. An integrated process for preparing a distillate fuel composition comprising iso-olefins, the process comprising:

(a) subjecting syngas to low temperature Fischer-Tropsch reaction conditions in the presence of a Fischer-Tropsch catalyst to form a hydrocarbon product stream comprising substantially waxy products;

(b) isolating the waxy products from the hydrocarbon product stream;

(c) subjecting the waxy products to an olefin-selective paraffin cracking process to form C₃₋₅ olefins;

(d) oligomerizing the C₃₋₅ olefins to form a hydrocarbon product comprising iso-olefins.

(e) distilling the hydrocarbon product of step (d) to provide distillate-boiling iso-olefins;

(f) adding the distillate-boiling iso-olefins to a distillate fuel composition.

12. The process of claim 11, wherein the olefin-selective paraffin cracking process comprises contacting the waxy products with a catalyst comprising an intermediate pore size siliceous crystalline molecular sieve having a silica:alumina mole ratio from about 25:1 to about 500:1.

13. The process of claim 11 wherein at least a portion of the distillate fuel composition is prepared by a Fischer Tropsch process.
14. The process of claim 13, wherein the distillate fuel composition further comprises one or more gasoline or diesel fuel additives.
15. The process of claim 11, further comprising the steps of hydrogenating at least a portion of the distillate-boiling iso-olefins to form isoparaffins and adding the isoparaffins to the distillate fuel composition.
16. The process of claim 11, wherein the Fischer Tropsch catalyst comprises a catalyst which provides high chain growth probabilities.
17. The process of claim 16, wherein the catalyst comprises cobalt.
18. The process of claim 11, further comprising the steps of: isolating a C_{3-5} olefins fraction from the hydrocarbon product stream; blending the C_{3-5} olefins fraction with the C_{3-5} olefins of step (c) to form a blended C_{3-5} olefins; and oligomerizing the blended C_{3-5} olefins to form a hydrocarbon product comprising iso-olefins.
19. The process of claim 11, wherein the hydrocarbon product stream comprises less than 10% methane.
20. The process of claim 11, wherein the hydrocarbon product stream comprises less than 5% methane.
21. An integrated process for preparing distillate fuel composition from syngas, the process comprising:
 - (a) converting methane and ethane to syngas in a syngas generator;

(b) subjecting the syngas to low temperature Fischer-Tropsch reaction conditions in the presence of a Fischer Tropsch catalyst to form a hydrocarbon product stream comprising substantially waxy products;

(c) isolating fractions from the hydrocarbon product stream in an isolation unit, wherein the fractions comprise:

- (i) a C₂- fraction;
- (ii) a C₃₋₅ olefin fraction;
- (iii) a distillate fuel fraction; and
- (iv) a waxy fraction;

(d) subjecting the waxy fraction to olefin-selective paraffin cracking conditions to form C₃₋₅ olefins;

(e) blending the C₃₋₅ olefins of steps (d) with the C₃₋₅ olefin fraction of step (c) to form blended C₃₋₅ olefins;

(f) oligomerizing the blended C₃₋₅ olefins in an oligomerization reactor to form a hydrocarbon product comprising iso-olefins;

(g) recycling the iso-olefins to the isolation unit; and

(h) recycling the C₂- fraction to the Fischer Tropsch reactor; and

(i) combining the distillate fuel fraction and the iso-olefins to provide a distillate fuel composition.

22. The process according to claim 21 wherein the olefin-selective paraffin cracking conditions comprise contacting the waxy fraction with a catalyst comprising an intermediate pore size siliceous crystalline molecular sieve having a silica:alumina mole ratio from about 25:1 to about 500:1.

23. The process of claim 21, wherein isolation unit comprises a distillation column.

24. The process of claim 21, further comprising the step of distilling the hydrocarbon product of step (f) to provide distillate-boiling iso-olefins and waxy hydrocarbons.

25. The process of claim 24, further comprising the step of recycling the waxy hydrocarbons to step (d).

26. The process of claim 21, further comprising the steps of isolating a naphtha fraction from the hydrocarbon product stream and combining the naphtha fraction with the distillate fuel fraction and the iso-olefins to provide a distillate fuel composition.

27. The process of claim 26, further comprising the step of subjecting the naphtha fraction to hydrotreatment, isomerization, or hydrotreatment and isomerization.

28. The process of claim 26, further comprising the step of subjecting the naphtha fraction to catalytic reforming.

29. The process of claim 21, further comprising the step of subjecting the distillate fuel fraction to hydrotreatment, isomerization, or hydrotreatment and isomerization.

30. The process of claim 21, further comprising the step of hydrogenating at least a portion of the iso-olefins to form iso-paraffins and recycling the iso-paraffins to the isolation unit.

31. The process of claim 21, further comprising the steps of recovering unconverted C_{3-5} paraffins from the oligomerization reactor; dehydrogenating the unconverted C_{3-5} paraffins to form olefins; and recycling the olefins to the oligomerization reactor.

32. The process of claim 21, wherein the low temperature Fischer-Tropsch catalyst comprises a catalyst which provides high chain growth probabilities.

33. The process of claim 21, wherein the hydrocarbon product stream comprises less than 10% methane.

34. The process of claim 21, wherein the hydrocarbon product stream comprises less than 5% methane.

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